Lightning Risk Reduction Outdoors

When Thunder Roars, Go Indoors!

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This document has two main sections: lightning safety when a safe location is nearby and risk reduction--not safety!--when a safe location is NOT close. No place is absolutely safe from lightning; however, some places are much safer than others. The SAFEST location during lightning activity is a large enclosed building, not a picnic shelter or shed. The second safest location is an enclosed metal vehicle, car, truck, van, etc., but NOT a convertible, bike or other topless or soft top vehicle.

Safe Buildings

A safe building is one that is fully enclosed with a roof, walls and floor, such as a home, school, office building or a shopping center. Even inside, you should take precautions. Picnic shelters, dugouts, sheds and other partially open or small structures are **NOT** safe.

Enclosed buildings are safe because of wiring and plumbing. If lightning strikes these types of buildings, or an outside telephone pole, the electrical current from the flash will typically travel through the wiring or the plumbing into the ground. This is why you should stay away from showers, sinks, hot tubs, etc., and electronic equipment such as TVs, radios, and computers.

Lightning can damage or destroy electronics so it's important to have a proper lightning protection system connected to your electronic equipment. The American Meteorological Society has tips for protecting your electronics from lightning.

Unsafe Buildings

Examples of buildings which are unsafe include car ports, covered but open garages, covered patio, picnic shelters, beach shacks/pavilions, golf shelters, camping tents, large outdoor tents, baseball dugouts and other small buildings such as sheds and greenhouses that do not have electricity or plumbing.

Safe Vehicle

A safe vehicle is a hard-topped car, SUV, minivan, bus, tractor, etc. (soft-topped convertibles are not safe) . If you seek shelter in your vehicle, make sure all doors are closed and windows rolled up. Do not touch any metal surfaces.

If you're driving when a thunderstorm starts, pull off the roadway. A lightning flash hitting the vehicle could startle you and cause temporary blindness, especially at night.

Do not use electronic devices such as HAM radios during a thunderstorm. Lightning striking the vehicle, especially the antennas, could cause serious injury if you are talking on the radio or holding the microphone at the time of the flash. Emergency officials such as police officers, firefighters, security officers, etc., should use extreme caution using radio equipment when lightning is in the area.

Your vehicle and its electronics may be damaged if hit by lightning. Vehicles struck by lightning are known to have flat tires the next day. This occurs because the lightning punctures tiny holes in the tires. Vehicles have caught fire after being struck by lightning; however, there is no modern day documented cases of vehicles "exploding" due to a lightning flash.

Bolts from the Blue

There are times when a lightning flash can travel horizontally many miles away from the thunderstorm cloud itself and then strike the ground. These types of lightning flashes are called "Bolts from the Blue" because they seem to come out of a clear blue sky. Although these flashes are rare, they have been known to cause fatalities.

When a Safe Location is Nearby:

- Seek safe shelter when you first hear thunder, see dark threatening clouds developing overhead or lightning. Count the seconds between the time you see lightning and hear the thunder. You should already be in a safe location if that time is less than 30 seconds.
- Stay inside until 30 minutes after you last hear thunder.

Figure: When you hear thunder, run to the nearest large building or a fully enclosed vehicle. You are not safe anywhere outside.

Click here to calculate how far lightning is away from you

Plan Ahead! Your best source of up-to-date weather information is a NOAA Weather Radio (NWR). Portable weather radios are handy for outdoor activities. If you don't have NWR, stay up to date via internet, TV, local radio or cell phone. If you are in a group, make sure all leaders or members of the group have a lightning safety plan and are ready to use it.

Determine how far you are from a safe enclosed building or a safe vehicle. As soon as you hear thunder, see lightning or see dark threatening clouds, get to a safe location. Then wait 30 minutes after the last rumble of thunder before you leave the safe location. If you are part of a group, particularly a large one, you will need more time to get all group members to safety. NWS recommends having professional lightning detection equipment so your group can be alerted from significant distances from the event site.

When groups are involved, the time needed to get to safety increases. So you need to start leaving sooner. Your entire group should already be in a safe location when the approaching storm reaches within 5 miles from your location.

Here some two common scenarios with suggestions on how to safely respond.

Coach of Outdoor Sports Team

You are a manager of a little league team and have a game this evening at the local recreational park. The weather forecast for the day calls for a partly cloudy skies, with a chance of thunderstorms by early evening. You arrive in your vehicle while the kids arrive with their parents. Once arriving at the park, you notice the only buildings are the the restrooms, an enclosed building. Shortly after sunset, the skies start to cloud up and you see bright flashes in the sky to the west. The local radio station mentions storms are on the way.

In this case, the safest locations are the vehicles the kids came in or the rest rooms. You should have a choice of allowing the kids to go back to their vehicles or bring everyone into the restrooms. It is important **NOT** to stay in the dugouts as they are not safe place during lightning activity. Once at a safe place, wait 30 minutes after the last rumble of thunder before going back outside.

Family at the Beach

You plan to go to the beach or lake later this morning with the kids. The weather forecast calls for a nice morning followed by a 30 percent chance of afternoon thunderstorms. You decide to head for the beach in your minivan. The beach is about 5 minutes from the parking lot. The only nearby buildings are picnic shelters. By early afternoon you notice the skies darkening and hear distant thunder. What would be your lightning safety plan of action?

In this case, the best place to go is your car. Do NOT seek shelter under the beach picnic shacks because these are not safe in lightning storms. Wait 30 minutes until after the last thunder crack before going back to the beach or driving home.

Camping

You and your family are camping. As you and your spouse are preparing dinner on the camp stove, you here rumbles of thunder in the distance. You look around and you see your tent is nearby, and a large picnic shelter is just down the trail. Your car is about ¼ of a mile away parked at the trail head. What should you and your family do?

In this case, the smartest thing to do is to round up your family and get into your car. The tent is not a safe place to be as it offers NO protection from a lighting flash. The picnic shelter is also not a safe location. (Both the tent and picnic shelter will keep you dry…but they offer NO protection from a lightning flash). It is best to remain in your vehicle for about 30 minutes after the last rumble of thunder is heard.

When a Safe Location Is Not Nearby

The lightning safety community reminds you that there is NO safe place to be outside in a thunderstorm. If you absolutely can't get to safety, this section is designed to help you lesson the threat of being struck by lightning while outside. Don't kid yourself--you are NOT safe outside.

Being stranded outdoors when lightning is striking nearby is a harrowing experience. Your first and only truly safe choice is to get to a safe building or vehicle. If you are camping, climbing, on a motorcycle or bicycle, boating, scuba diving, or enjoying other outdoor activities and cannot get to a safe vehicle or shelter, follow these last resort tips. These will not prevent you from being hit, just *slightly* lesson the odds.

- Do **NOT** seek shelter under tall isolated trees. The tree may help you stay dry but will significantly increase your risk of being struck by lightning. Rain will not kill you, but the lightning can!
- Do **NOT** seek shelter under partially enclosed buildings
- Stay away from tall, isolated objects. Lightning typically strikes the tallest object. That may be you in an open field or clearing.
- Know the weather patterns of the area. For example, in mountainous areas, thunderstorms typically develop in the early afternoon, so plan to hike early in the day and be down the mountain by noon.
- Know the weather forecast. If there is a high chance of thunderstorms, curtail your outdoor activities.
- Do not place your campsite in an open field on the top of a hill or on a ridge top. Keep your site away from tall isolated trees or other tall objects. If you are in a forest, stay near a lower stand of trees. If you are camping in an open area, set up camp in a valley, ravine, or other low area. A tent offers NO protection from lighting.
- Wet ropes can make excellent conductors. This is BAD news when it comes to lightning activity. If you are mountain climbing and see lightning, and can do so safely, remove unnecessary ropes extended or attached to you. If a rope is extended across a mountain face and lightning makes contact with it, the electrical current will likely travel along the rope, especially if it is wet.
- Stay away from metal objects, such as fences, poles and backpacks. Metal is an excellent conductor. The current from a lightning flash will easily travel for long distances (See Figure 1)

Figure: Dead cows lined up along a metallic fence. Lightning struck the fence, and the current traveled along the fence killing the cows. *Photo Courtesy Ruth Lyon-Bateman*

If lightning is in the immediate area, and there is no safe location nearby, stay at least 15 feet apart from other members of your group so the lightning won't travel between you if hit. Keep your feet together and sit on the ground out in the open. If you can possibly run to a vehicle or building, DO so. Sitting or crouching on the ground is not safe and should be a last resort if a enclosed building or vehicle is not available.

Motorcyclist/Bicyclist: So has anyone been hit riding a bike? Here are just a few real examples from the last few years.

- Virginia Beach, VA: Motorcyclist killed while traveling on Route 58.
- Altoona, PA: One motorcycle rider killed and three riders injured when they took shelter in a woods from a thunderstorm.
- Wyoming: Motorcyclist injured while driving home on I-90 from Sturgis.
- Taylor Park, CO: Dirt biker injured while heading down mountain pass.

Protect Yourself when on a bicycle, motorcycle or dirt bike.

- Carry a portable Weather Radio or listen to commercial radio.
- If you see threatening skies in the distance and you are passing a safe location, pull over and wait 30 minutes after the last thunder crack.
- If you can turn around and get away from the storm, do so!
- DO NOT ride into a lighting storm!

If you absolutely cannot get to a safe building or vehicle, here are some last resort choices:

- Wait out the storm below an overpass. DO NOT touch steel girders. Move away from your bike. Remain on dry surfaces if possible. Overpasses are engineered structures and are likely to be properly grounded. Although an overpass is likely to be higher than the surrounding landscape, if it is struck by lightning, the electrical current will likely be channeled safely into the ground.
- Look for a bridge. Stay away from water. Stay away from any metal surfaces. Be alert for rapidly rising water if under a bridge.
- High tension wires: If high voltage electrical tension wires cross the road, you may want to seek shelter directly underneath these wires. Do not get too close to the large metal towers which hold up these wires. Stay at least 50 feet away. Electric companies design these high tension wires for lightning strikes. If lighting should strike the wires or towers, the current is designed to safely go deep into the ground.
- If you are caught in the open and lightning is occurring within 5 miles, **STOP** riding, get off of your motorcycle/bicycle, find a ditch or other low spot and sit down.
- Motorcyclists should move at least 50 feet away from their bike. Bicyclist should lay their bikes on the ground.

IMPORTANT: These recommendations are a last resort. You are NOT safe in these places just marginally safer than in the open.

Click here to read a story about a motorcyclist killed while riding in lightning.

On the Water

The vast majority of lightning injuries and deaths on boats occur on small boats with NO cabin. It is crucial to listen to the weather on a small aquatic vessel without a cabin. If thunderstorms are forecast, don't go out. If you are out on the water and skies are threatening, get back to land and find a safe building or vehicle.

Boats with cabins offer a safer but not perfect environment. Safety is increased further if the boat has a properly installed lightning protection system. If you are inside the cabin, stay away from metal and all electrical components. STAY OFF THE RADIO UNLESS IT IS AN ABSOLUTE EMERGENCY!

What should you do if you are on a small vessel and lightning becomes a threat? If the vessel has an anchor, then you should properly anchor the boat then get as low as possible.

Large boats with cabins, especially those with lightning protection systems properly installed or metal marine vessels are relatively safe. Remember to stay inside the cabin and away from any metal surfaces.

Scuba Divers

If the boat you are in does not have a safe cabin to be in during lightning activity, then you are safer diving deep into the water for the duration of the storm or as long as possible. Your first choice is to head in and get in safe building or vehicle.

Overview, Science, Outdoors, Indoors, Medical, Teachers, Survivor Stories,
Success Stories, Photos, Lightning Awareness Week, More Info

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